<u>In the Claims:</u>

Kindly amend the claims as indicated.

1.   (PreviouslyPresented)   A reprogrammable metal-to-metal antifuse comprising:

an inter-metal dielectric layer having a via formed therethrough and filled with a metal plug;

a lower Ti barrier layer disposed over said metal plug;

a lower adhesion-promoting layer disposed over said lower Ti barrier layer;

an antifuse material layer disposed above an upper surface of said lower adhesion-promoting layer, said antifuse material layer selected from a group comprising at least one of amorphous carbon and amorphous carbon doped with at least one of hydrogen and fluorine disposed over said lower adhesion-promoting layer;

an upper adhesion-promoting layer disposed over said antifuse material layer; and

an upper Ti barrier layer disposed over said upper adhesion-promoting layer,

wherein:

said lower adhesion-promoting layer and said upper adhesion-promoting layer each have a thickness of between about 2 angstroms and about 20 angstroms;

the reprogrammable metal-to-metal antifuse is programmed in response to a programming potential applied across the antifuse; and

the reprogrammable metal-to-metal antifuse is erased in response to an erasing potential, lower in magnitude than the programming potential, across the antifuse.

2.   (Canceled)

3.   (Original)   The reprogrammable metal-to-metal antifuse of claim 1, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are comprised of a material selected from the group comprising Si_xC_y and Si_xN_y.

4. (Original) The reprogrammable metal-to-metal antifuse of claim 3, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

5. (Original) The reprogrammable metal-to-metal antifuse of claim 4, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

6. (Original) The reprogrammable metal-to-metal antifuse of claim 3, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

7. (Original) The reprogrammable metal-to-metal antifuse of claim 6, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

8. (Previously Presented) The reprogrammable metal-to-metal antifuse of claim 1, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are from a material selected from the group comprising Si_xC_y and Si_xN_y.

9. (Original) The reprogrammable metal-to-metal antifuse of claim 8, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

10. (Original) The reprogrammable metal-to-metal antifuse of claim 9, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

11. (Original) The reprogrammable metal-to-metal antifuse of claim 8, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

12. (Original) The reprogrammable metal-to-metal antifuse of claim 8, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

13. (Original) The reprogrammable metal-to-metal antifuse of claim 1, wherein said antifuse material layer is formed from amorphous carbon having a thickness of between about 50 angstroms and about 500 angstroms.

14. (Original) The reprogrammable metal-to-metal antifuse of claim 1, wherein said antifuse material layer comprises amorphous carbon doped with hydrogen in a concentration range of about 1 atomic percent to about 40 atomic percent.

15. (Original) The reprogrammable metal-to-metal antifuse of claim 14, wherein said antifuse material layer has a thickness of between about 50 angstroms and about 500 angstroms.

16. (Original) The reprogrammable metal-to-metal antifuse of claim 1, wherein said antifuse material layer is about 50 angstroms to 500 angstroms in thickness, and said lower adhesion-promoting layer and said upper adhesion-promoting layer each have a thickness of between about 2 angstroms and about 20 angstroms.

17. (Original) The reprogrammable metal-to-metal antifuse in claim 16, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are from a material selected from the group comprising Si_xC_y and Si_xN_y.

18. (Original) The reprogrammable metal-to-metal antifuse of claim 17, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

19. (Original) The reprogrammable metal-to-metal antifuse of claim 18, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

20. (Original) The reprogrammable metal-to-metal antifuse of claim 17, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

21.   (Original)   The reprogrammable metal-to-metal antifuse of claim 20, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

22.   (Original)   The reprogrammable metal-to-metal antifuse of claim 17, wherein said amorphous carbon antifuse material layer is doped with hydrogen from about 1 atomic percent to about 40 atomic percent.

23.   (PreviouslyPresented)   A reprogrammable metal-to-metal antifuse comprising:

a lower metal interconnect layer;

an inter-metal dielectric layer disposed over said lower metal interconnect layer, said inter-metal dielectric layer having a via formed therethrough and filled with a metal plug;

a lower Ti barrier layer disposed over said metal plug;

a lower adhesion-promoting layer disposed over said lower Ti barrier layer;

an antifuse material layer formed from amorphous carbon and disposed over said lower adhesion-promoting layer;

an upper adhesion-promoting layer disposed over said antifuse material layer;

an upper Ti barrier layer disposed over said upper adhesion-promoting layer; and

an upper metal interconnect layer disposed over said upper Ti barrier layer,

wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer each have a thickness of between about 2 angstroms and about 20 angstroms;

the reprogrammable metal-to-metal antifuse is programmed in response to a programming potential applied across the antifuse; and

the reprogrammable metal-to-metal antifuse is erased in response to an erasing potential, lower in magnitude than the programming potential, across the antifuse.

24.   (Original)   The reprogrammable metal-to-metal antifuse of claim 23, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer are comprised of a material selected from the group comprising Si_xC_y and Si_xN_y.

25.   (Original)   The reprogrammable metal-to-metal antifuse of claim 24, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xC_y.

26.   (Original)   The reprogrammable metal-to-metal antifuse of claim 25, wherein a ratio of x to y in said Si_xC_y is in a range of about 1 +/- 0.4.

27.   (Original)   The reprogrammable metal-to-metal antifuse of claim 24, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer comprise Si_xN_y.

28.   (Original)   The reprogrammable metal-to-metal antifuse of claim 27, wherein a ratio of x to y in said Si_xN_y is in a range of about .75 +/- 0.225.

29.   (Original)   The reprogrammable metal-to-metal antifuse of claim 23, wherein said antifuse material layer has a thickness of between about 50 angstroms and about 500 angstroms.

30.   (Original)   The reprogrammable metal-to-metal antifuse of claim 23, wherein said amorphous carbon antifuse material layer is doped with hydrogen in a concentration range of about 1 atomic percent to about 40 atomic percent.

31.   (Original)   The reprogrammable metal-to-metal antifuse of claim 30, wherein said amorphous carbon antifuse material layer has a thickness of between about 50 angstroms and about 500 angstroms.

32.   (Original)   The reprogrammable metal-to-metal antifuse of claim 23, wherein said lower adhesion-promoting layer and said upper adhesion-promoting layer

are comprised of a material selected from the group comprising Si_xC_y, Si_xN_y, $Si_xC_yN_z$, $Si_xO_yC_z$, and $Si_xO_yN_z$.

33. (PreviouslyPresented)   A reprogrammable metal-to-metal antifuse comprising:

an inter-metal dielectric layer having a via formed therethrough and filled with a metal plug;

a lower Ti barrier layer disposed over said metal plug;

a lower Si_xC_y layer disposed over said lower Ti barrier layer;

an antifuse material layer comprised of amorphous carbon and disposed over said lower Si_xC_y layer;

an upper Si_xC_y layer disposed over said antifuse material layer; and

an upper Ti barrier layer,

wherein said lower Si_xC_y layer and said upper Si_xC_y layer each have a thickness of between about 2 angstroms and about 20 angstroms;

the reprogrammable metal-to-metal antifuse is programmed in response to a programming potential applied across the antifuse; and

the reprogrammable metal-to-metal antifuse is erased in response to an erasing potential, lower in magnitude than the programming potential, across the antifuse.

34. (PreviouslyPresented)   A reprogrammable metal-to-metal antifuse comprising:

an inter-metal dielectric layer having a via formed therethrough and filled with a metal plug;

a lower Ti barrier layer disposed over said metal plug;

a lower Si_xN_y layer disposed over said lower Ti barrier layer;

an antifuse material layer comprised of amorphous carbon and disposed over said lower Si_xN_y layer;

an upper Si_xN_y layer disposed over said antifuse material layer; and

an upper Ti barrier layer,

wherein said lower Si_xN_y layer and said upper Si_xN_y layer each have a thickness of between about 2 angstroms and about 20 angstroms;

the reprogrammable metal-to-metal antifuse is programmed in response to a programming potential applied across the antifuse; and

the reprogrammable metal-to-metal antifuse is erased in response to an erasing potential, lower in magnitude than the programming potential, across the antifuse.

35.   (Withdrawn) A method for fabricating a reprogrammable metal-to-metal antifuse, comprising:

planarizing an insulating layer and a tungsten plug;

forming a lower Ti barrier layer over said insulating layer and said tungsten plug;

forming a lower adhesion-promoting layer over said lower Ti barrier layer, said lower adhesion-promoting layer selected from the group comprising Si_xC_y and Si_xN_y;

forming an antifuse material layer over said lower adhesion-promoting layer, wherein said antifuse material layer is selected from the group comprising amorphous carbon, amorphous carbon doped with at least one of hydrogen and fluorine, and amorphous silicon carbide;

forming an upper adhesion-promoting layer over said antifuse material layer, said upper adhesion-promoting layer selected from the group comprising Si_xC_y and Si_xN_y;

forming an upper Ti barrier metal layer over said antifuse material layer;

forming an oxide or tungsten hardmask layer over said barrier metal layer;

forming a layer of photoresist over said hardmask layer;

defining said hardmask layer;

removing said photoresist;

defining a shape of a stack for said antifuse by etching said upper Ti barrier layer, said upper adhesion-promoting layer, said antifuse material layer, said lower adhesion-promoting layer, and said lower Ti barrier metal layer using said hardmask layer as a mask;

forming an insulating layer over said stack;

8

forming an aperture in said insulating layer;

forming a metal interconnect layer over said insulating layer and in said aperture;

forming a second masking layer over said metal interconnect layer; and

defining said metal interconnect layer.

36-46. (Canceled).